REMARKS

The foregoing amendments are responsive to the December 19, 2005 Office Action. Applicant respectfully request reconsideration of the present application in view of the foregoing amendments and the following remarks.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Response to Rejection of Claims 47 and 49 Under 35 U.S.C. 112, First paragraph

The Examiner rejected Claims 47 and 49 under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement.

Applicant has amended Claims 47 and 49 to recite a non-intertwining portion of space, as described in the specification.

Accordingly, Applicant requests the Examiner to withdraw the rejection to Claims 47 and 49 under 35 U.S.C. 112, first paragraph.

Response to Rejection of Claims 38 and 39 Under 35 U.S.C. 112, Second paragraph

The Examiner rejected Claims 38 and 39 under 35 U.S.C. 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner argues that the term "substantially similar" renders Claims 38 and 39 indefinite. Applicant respectfully disagrees. The Court of Appeals for the Federal Circuit has repeatedly found claims with the phrase "substantially similar" to be definite. *See e.g., Liquid Dynamics Corp. v. Vaughn Co. Inc.*, 355 F.3d 1361, 69 USPQ2d 1595 (Fed. Cir. 2004) (The term "substantial helical path was not ambiguous. "Substantial" is a "meaningful modifier implying 'approximate,' rather than 'perfect.'"). "*See e.g., Epcon Gas Sys., Inc. V. Bauer Compressors, Inc.*, 279 F.3d 1022 (Fed Cir. 2002) (construing the terms 'substantially constant' and 'substantially below'); *Zodiac Pool Care, Inc. v. Hoffinger Indus., Inc.* 206 F.3d 1408 (Fed. Cir. 200) (construing the term 'substantially inward'); *York Prods., Inc. v. Cent. Tractor Farm & Family Ctr.*, 99 F.3d 1568 (Fed. Cir. 1996) (construing the term 'substantially the entire height thereof'); *Tex. Instruments Inc. v. Cypress Semiconductor Corp.*, 90 F.3d 1558 (Fed. Cir. 1996) (construing the term 'substantially in the common plane')."

Deering Precision Instruments, L.L.C. v. Vector Distribution Systems, Inc., 347 F.3d 1314, 68 USPQ2d 1716 (Fed. Cir. 203).

Accordingly, Applicant requests the Examiner to withdraw the rejection to Claims 38 and 39 under 35 U.S.C. 112, second paragraph.

<u>Cancellation of Claims 23-33</u>

Claims 23-33 have been canceled and re-filed in a divisional application, as requested by the Examiner.

<u>New Claims 52-54</u>

Applicant has added dependent Claims 52-54 to further define various embodiments of the invention. Claims 52-54 do not add new matter and are supported by the specification as filed (*see, e.g.,* page 10 of the specification).

Applicant asserts that Claims 52-54 are allowable over the prior art, and Applicant request allowance of Claims 52-54.

<u>Response to Rejection of Claims 1-37 and 39-51 Under 35 U.S.C. 102(b)</u>

The Examiner rejected Claims 1-37 and 39-51 under 35 U.S.C. 102(b) as being anticipated by Canning et al., Rockwell Inst. Sci. Center, "Fast Direct Solution of Standard Moment-Method Matrices," IEEE Antennas and Propagation Magazine, June 1998, pages 15-26, hereafter referred to as Rockwell.

In Rockwell, a single decomposition such as a Singular Value Decomposition (SVD) on a matrix is used to produce both new sources and new testers to be used with each other to compress the data in that matrix. By contrast, for Claim 1 when both M and N are greater than one, reducing a rank of a matrix of transmitted disturbances yields a second set of basis functions and reducing a rank of a matrix of received disturbances yields a second set of weighting functions. Rockwell does not teach or suggest that a second set of basis functions and a second set of weighting functions are be obtained by separate rank reductions.

For Claim 1 when M is one, the teachings of Rockwell would produce a matrix with a dimension of 1 by p as a product of itself and a vector of length one, which is trivial. Rockwell

does not teach or suggest a rank reduction on a 1 by p matrix. Claim 1 recites reducing a rank of said matrix of transmitted disturbances to yield a second set of basis functions. This reducing a rank is non-trivial since N is greater than one when M is one.

For Claim 1 when N is one, the teachings of Rockwell would produce a matrix with a dimension of p by 1 as a product of itself and a vector of length one, which again is trivial. Rockwell does not teach or suggest a rank reduction on a p by 1 matrix. Claim 1 recites reducing a rank of said matrix of received disturbances to yield a second set of testing functions. This reducing a rank is non-trivial since M is greater than one when N is one.

Thus, regarding Claim 1, the cited prior art does not teach or suggest a method of data compression, comprising: partitioning a first set of basis functions into groups, each group corresponding to a region, each basis function corresponding to one unknown in a system of linear equations, each of said basis functions corresponding to an original source; selecting a plurality of spherical angles; using a computer system, calculating a far-field disturbance produced by each of said basis functions in a first group for each of said spherical angles to produce a matrix of transmitted disturbances; reducing a rank of said matrix of transmitted disturbances to yield a second set of basis functions, said second set of basis functions corresponding to composite sources, each of said composite sources comprising a linear combination of a number N of said original basis functions; partitioning a first set of weighting functions into groups, each group corresponding to one of said regions, each weighting function corresponding to a condition, each of said weighting functions corresponding to an original tester; using a computer system, calculating a far-field disturbance received by each of said testers in a first group for each of said spherical angles to produce a matrix of received disturbances; reducing a rank of said matrix of received disturbances to yield a second set of weighting functions, said second set of weighting functions corresponding to composite testers, each of said composite testers comprising a linear combination of a number M of said original testers, wherein at least one of either M or N is greater than one; and transforming said system of linear equations to use said composite sources and said composite testers.

In Rockwell, a single Singular Value Decomposition (SVD) on a matrix is used to produce both new sources and new testers to be used with each other to compress the data in that matrix. Rockwell teaches that the new sources and testers are computed from a single SVD, but

the SVD does not produce both composite sources configured to produce a relatively weak disturbance from a portion of space around a composite source and composite testers configured to weakly receive disturbances from a portion of space relative to a composite tester. In Rockwell, the new sources and testers are computed together, and must be used together. The new sources and testers of Rockwell are configured to interact weakly with each other. Rockwell does not teach that its new sources transmit weakly or that its new testers receive weakly in a portion of space. The use of separate rank reductions (using an SVD or other technique) for the sources and for the testers allows both composite sources configured to produce a relatively weak disturbance from a portion of space around a composite source and composite testers configured to weakly receive disturbances from a portion of space relative to a composite tester.

Thus, regarding Claim 2, the cited prior art does not teach or suggest partitioning a first set of basis functions into groups, each group corresponding to a region, each basis function corresponding to an unknown in a system of equations, each of the basis functions corresponding to an original source, selecting a first plurality of angular directions, using a computer system, calculating a disturbance produced by each of the basis functions in a first group for each of the angular directions to produce a matrix of disturbances, using the matrix of disturbances to compute a second set of basis functions, the second set of basis functions corresponding to composite sources, wherein at least one of the composite sources is configured to produce a relatively weak disturbance from a portion of space around the at least one composite source, partitioning a first set of weighting functions into groups, each group corresponding one of the regions, each weighting function corresponding to a condition, each of the weighting functions corresponding to an original tester, using a computer system, calculating a disturbance received by each of the testers in a second plurality of angular directions to produce a matrix of received disturbances, using the matrix of received disturbances to compute a second set of weighting functions, the second set of weighting functions corresponding to composite testers, wherein at least one of the composite testers is configured to weakly receive disturbances from a portion of space relative to the at least one composite tester; and transforming at least a portion of the system of equations to use one or more of the composite sources and one or more of the composite testers.

Regarding Claim 3, the cited prior art does not teach or suggest that matrix of disturbances is a moment method matrix.

Regarding Claim 4, the cited prior art does not teach or suggest that step of using said matrix of disturbances to compute a second set of basis functions comprises reducing a rank of said matrix of disturbances.

Regarding Claim 5, the cited prior art does not teach or suggest that step of using said matrix of received disturbances to compute a second set of weighting functions comprises reducing a rank of said matrix of received disturbances.

Regarding Claim 6, the cited prior art does not teach or suggest that disturbance is at least one of an electromagnetic field, a heat flux, an electric field, a magnetic field, a vector potential, a pressure, a sound wave, a particle flux, a weak nuclear force, a strong nuclear force, and a gravity force.

Regarding Claim 7, the cited prior art does not teach or suggest that first plurality of directions is substantially the same as said second plurality of directions.

Regarding Claim 8, the cited prior art does not teach or suggest that regions of space around said at least one composite source are far-field regions.

Regarding Claim 9, the cited prior art does not teach or suggest that at least a portion of a region around said at least one composite tester is a far-field region.

With regard to Claim 10: In Rockwell, a single Singular Value Decomposition (SVD) on a matrix is used to produce both new sources and new testers to be used with each other to compress the data in that matrix. Rockwell teaches that the new sources and testers are computed from a single SVD, but the SVD does not produce both composite sources configured to produce a relatively weak disturbance from a portion of space around a composite source and composite testers configured to weakly receive disturbances from a portion of space. Rockwell only teaches that it produces new sources and new testers that may be used together, and does not teach that either produces a weak effect in a portion of space. Separately producing composite sources and composite testers as taught in this application allows both composite sources configured to produce a relatively weak disturbance from a portion of space around a composite source and composite testers configured to weakly receive disturbances from a portion of space relative to a

composite tester The composite sources and composite testers of Claim 10 can be used separately or together.

Thus, regarding Claim 10, the cited prior art does not teach or suggest a method of data compression, comprising: calculating one composite source as a linear combination of more than one basis function, wherein at least one of said composite sources is configured to produce a relatively weak disturbance in a portion of space related to said at least one composite source, using a computer system, calculating one composite tester as a linear combination of more than one weighting function, wherein at least one of said composite testers is configured to be relatively weakly affected by disturbances propagating from a portion of space around said at least one composite tester, and transforming at least a portion of a first system of equations based on said basis functions and said weighting functions into a second system of equations based on said composite sources and said composite testers.

Regarding Claim 11, the cited prior art does not teach or suggest that disturbance is at least one of, an electromagnetic field, a heat flux, an electric field, a magnetic field, vector potential, a pressure, a sound wave, a particle flux, a weak nuclear force, strong nuclear force, and a gravity force.

Regarding Claims 12-16, the cited prior art does not teach or suggest that a technique applies not only to antenna and propagation problem, but also to all electromagnetic problems.

Regarding Claim 17, the cited prior art does not teach or suggest that each of said composite sources corresponds to a region.

Regarding Claim 18, the cited prior art does not teach or suggest that second system of equations is described by a sparse block diagonal matrix.

Regarding Claim 19, the cited prior art does not teach or suggest that comprising the step or reordering said sparse block diagonal matrix to shift relatively larger entries in said matrix towards a desired corner of said matrix.

Regarding Claim 20, the cited prior art does not teach or suggest that comprising the step of solving said second system of equations.

Regarding Claim 21, the cited prior art does not teach or suggest that the step of solving said second system of equations to produce a first solution vector, said first solution vector expressed in terms of said composite testers.

Regarding Claim 22, the cited prior art does not teach or suggest that comprising the step of transforming said first solution vector into a second solution vector, said second solution vector expressed in terms of said weighting functions.

Regarding Claim 34, the cited prior art does not teach or suggest that said transforming said system of linear equations produces a substantially sparse system of linear equations.

Regarding Claim 35, the cited prior art does not teach or suggest that N is greater than one and M is greater than one.

Regarding Claim 36, the cited prior art does not teach or suggest said transforming said system of linear equations produces a substantially sparse system of linear equations.

Regarding Claim 37, the cited prior art does not teach or suggest that said matrix of transmitted disturbances is substantially different from said matrix of received disturbances.

Regarding Claim 39, the cited prior art does not teach or suggest that said matrix of transmitted disturbances is a rectangular matrix having a different number of rows and columns, and wherein said composite sources are substantially similar to said composite testers.

Regarding Claim 40, the cited prior art does not teach or suggest that said matrix of received disturbances comprises a moment-method matrix.

Regarding Claim 41, the cited prior art does not teach or suggest that said matrix of transmitted disturbances comprises a moment-method matrix.

Regarding Claim 42, the cited prior art does not teach or suggest that said matrix of received disturbances comprises a moment-method matrix.

Regarding Claim 43, the cited prior art does not teach or suggest that said transforming at least a portion of said system of equations to use one or more of said composite sources and one or more of said composite testers comprises transforming substantially all of said system of equations to use one or more of said composite sources and one or more of said composite testers.

Regarding Claim 44, the cited prior art does not teach or suggest that said transforming substantially all of said system of equations produces substantial sparseness.

Regarding Claim 45, the cited prior art does not teach or suggest that said relatively weak disturbance from a portion of space around said at least one composite source comprises a relatively weak disturbance from a far-field portion of space.

Regarding Claim 46, the cited prior art does not teach or suggest that said relatively weak disturbance from a portion of space around said at least one composite source comprises a portion of space at distances relatively shorter than a distance to other physical regions comprises a relatively more dense portion of space.

Regarding Claim 48, the cited prior art does not teach or suggest that said relatively weak disturbance from a portion of space around said at least one composite source comprises a portion of space comprising substantially all angular directions in said first plurality of angular directions.

Regarding Claim 49, the cited prior art does not teach or suggest that said portion of space comprising substantially all angular directions in said first plurality of angular directions comprises a relatively more dense portion of space.

Regarding Claim 50, the cited prior art does not teach or suggest that said transforming at least a portion of a first system of equations comprises transforming substantially all of a first system of equations based on said basis functions and said weighting functions into a second system of equations based on said composite sources and said composite testers.

Regarding Claim 51, the cited prior art does not teach or suggest that said second system of equations is substantially sparse.

Accordingly, Applicant asserts that Claims 1-22 and 39-51 are allowable over the prior art, and Applicant requests allowance of Claims 1-22 and 39-51.

<u>Response to Rejection of Claims 10-11 Under 35 U.S.C. 102(b)</u>

The Examiner rejected Claims 10-11 under 35 U.S.C. 102(b) as being anticipated by Nabors et al., "FastCap: A Multipole Accelerated 3-D Capacitance Extraction Program", IEEE Transactions on Computer-Aid Design, Vol. 10, No. 11, November 1991, pages 1447-1459.

Nabors teaches that "[t]he complicated evaluations involved in converting charges to potentials or multipole coefficients, shifting multipole coefficients, converting multipole coefficients to local coefficients, shifting local coefficients, converting local coefficients to potentials are all computed once and stored as matrices which operate on charges or coefficients" (see, e.g., page 1452, second column). Using these matrices which are factors differs from producing a transformation as recited in Claim 10. Moreover, Nabors does not teach or suggest

calculating composite sources configured to produce a relatively weak disturbance in a portion of space and calculating composite testers configured to be relatively weakly affected by disturbances propagating from a portion of space.

Accordingly, Applicant asserts that Claims 10-11 are allowable over the prior art, and Applicant requests allowance of Claims 10-11.

Summary

Applicant respectfully asserts that Claims 1-22 and 34-54 are in condition for allowance, and Applicant request allowance of Claims 1-22 and 34-54. If there are any remaining issues that can be resolve by a telephone conference, the Examiner is invited to call the undersigned attorney at (949) 721-6305 or at the number listed below.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: May 19, 2006

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